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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/575,556  | 05/18/2006  | J. Donald Carruthers | 2771-682            | 8937             |
| 23448 7590 09/17/2009<br>INTELLECTUAL PROPERTY / TECHNOLOGY LAW<br>PO BOX 14329<br>RESEARCH TRIANGLE PARK, NC 27709 |             |                      |                     |                  |
| EXAMINER  |             |                      |                     |                  |
| AKRAM, IMRAN  |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
| 1795  |             |                      |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/575,556

**Applicant(s)**

CARRUTHERS ET AL.

**Examiner**

IMRAN AKRAM

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 August 2009.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-84 is/are pending in the application.  
4a) Of the above claim(s) 28-84 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-27 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 10 April 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date 4/10/06, 1/9/07  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_  
5) ☐ Notice of Inventor's Patent Application  
6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

3. Applicant's election with traverse of group I, claims 1-27 in the reply filed on 8/3/09 is acknowledged. The traversal is on the ground(s) that groups I-V are drawn to decomposition of the sorbate gas to form hydrogen, whereas the cited Tom (US 5,518,528) reference teaches avoidance of decomposition. This is not found persuasive because the common technical feature among the groups of claims does not include decomposition to hydrogen. Claim 1 does not mention the formation of hydrogen, only a decomposition chamber in which sorbate is decomposed. In fact, claims 36 (group III) does not contain even a decomposition chamber, but rather that sorbate decomposes in the storage vessel. Tom discloses that decomposition does occur, just not in significant amounts (column 3, lines 8-16), which is still appropriate for indicating that the common technical features between the groups is not special. New claim 84 does nothing to change the common technical features between the groups.

The requirement is still deemed proper and is therefore made FINAL.

4. Claims 28-84 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected groups, there being no allowable generic or linking claim.

***Specification***

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Drawings***

6. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Double Patenting***

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 12 of U.S. Patent No. 6,176,271 B1.

Although the conflicting claims are not identical, they are not patentably distinct from each other because they contain the same components. Both claims contain a storage and dispensing vessel with a sorbate gas (germane) and a physical sorbent medium. The space in the vessel is equivalent to a decomposition portion and the getter of the patent is equivalent to a collection portion with a membrane between them.

#### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-7, 9, 10, 13, 14, and 16-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Hultquist (US 6,132,492).

11. Regarding claim 1, Hultquist discloses a sorbate gas (column 14, lines 62-67); a storage and dispensing vessel **102** with a physical sorbent material **108** that adsorbs the sorbate gas (column 14, lines 58-67); a decomposition chamber comprising a decomposition portion **106** and a collection portion **138** located within the vessel (see figure 2), in fluid communication with the vessel (column 15, lines 13-28), and with a

hydrogen permeable membrane **136** situated between the decomposition portion and collection portion (see figure 3).

12. Regarding claim 2, Hultquist discloses that the storage and dispensing vessel comprises a vessel **10** with a solid-phase physical sorbent medium **17** disposed within (column 9, lines 55-61) inherently at a given pressure; a sorbate gas adsorbed onto the sorbent medium (column 10, lines 1-5); and a manifold **12** that acts as a dispensing assembly which dispenses desorbed gas (column 10, lines 12-16).

13. Regarding claims 3-5, Hultquist discloses the sorbate gas to be silane, germane, or diborane (column 14, lines 1-9).

14. Regarding claim 6, Hultquist discloses that the solid-phase physical sorbent medium is silica, carbon molecular sieves, alumina, macroporous polymers, kieselguhr, carbon, or aluminosilicates (column 4, lines 48-53).

15. Regarding claim 7, Hultquist discloses that the gas permeable membrane is selective for hydrogen over the sorbate gas (column 15, lines 41-45).

16. Regarding claims 9, 10, 21, and 22, Hultquist discloses a phosphoric acid doped carbon adsorbent in the decomposition portion of the decomposition chamber (column 13, lines 40-61).

17. Regarding claims 13 and 14, Hultquist discloses that the gas sorbate decomposes within the decomposition portion (column 14, lines 62-67).

18. Regarding claims 16-18, Hultquist discloses a valve **118** disposed in the vessel and process condition dependent internal pressure (column 1, lines 56-65).

19. Regarding claims 19 and 20, Hultquist discloses pressure differentiation and a heater **11** to effect desorption and dispensation (column 4, lines 30-38).
20. Regarding claim 23, Hultquist discloses that the sorbate gas decomposes at room temperature (column 11, lines 51-55).
21. Regarding claims 24-26, Hultquist discloses that the arsine decomposes to hydrogen (column 14, lines 62-67). Antimony is a product in this decomposition and the decomposition is reversible.
22. Regarding claim 27, Hultquist discloses that the collection portion **138** contains hydrogen (column 15, lines 56-60).

***Claim Rejections - 35 USC § 103***

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

25. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

26. Claims 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holtquist as applied to claims 1 and 9 above, respectively.

27. Regarding claim 8, Holtquist discloses a gas permeable membrane specific to hydrogen, but not that it is made from perfluorosulfonic acid. Perfluorosulfonic acid is a well-known material for proton permeable membranes, however (See, for example, US 2004/0076871 A1 to Gascoyne, paragraph 2). It would have been obvious to one having ordinary skill in the art at the time of invention to use perfluorosulfonic acid for the gas permeable membrane of Holtquist as it is an effective membrane for hydrogen selectivity.

28. Regarding claim 11, Holtquist discloses a carbon adsorbent in the decomposition portion, but not that it is doped with boric acid. Boric acid is a known adsorbent, however (See, for example, US 5,096,680 to Lindbauer, column 6, lines 25-32). It would



have been obvious to one having ordinary skill in the art at the time of invention to dope the adsorbent of Holtquist with boric acid to aid in the adsorption of impurities.

29. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holtquist as applied to claim 2 above, and further in view of Keefer (US 2002/0112479 A1).

30. Holtquist discloses a valve between the storage and dispensing vessel and utilization system (see figure 1), but not that the decomposition chamber is located downstream of the vessel or that a fuel cell is part of the utilization system. Holtquist discloses that hydrogen is removed from the sorbate gas because it is an unwanted impurity (column 15, lines 13-28). Keefer, however, discloses that the source of fuel for a fuel cell can be hydrogen from sorbate adsorbed to a physical adsorbent (paragraph 34). It would have been obvious to one having ordinary skill in the art at the time of invention to separate the decomposition chamber of Holtquist from the storage and dispensing vessel so as to collect the hydrogen for use in the fuel cell of Keefer to minimize waste and make use of a byproduct as fuel.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Imran Akram/  
Examiner, Art Unit 1795

/Jennifer K. Michener/  
Supervisory Patent Examiner, Art Unit 1795